

# Disjunctive Datalog: from Monadic to Guarded

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# Some Equivalences

Motivation: strong equivalences between [ontology-mediated queries](#),  
and [disjunctive Datalog](#) (and CSPs)

$(\mathcal{ALC}, \text{CQ}) \equiv$  monadic disjunctive Datalog (MDDLog)  
 $\cup \dagger$  (= coMMSNP)

$(\text{GF}, \text{CQ}) \equiv$  frontier-guarded disjunctive Datalog (FGDDLog)  
(= coMMSNP<sub>2</sub>)

MDDLog fairly well understood:

- query containment decidable
- MDLog-rewritability decidable
- FO-rewritability decidable
- P/coNP dichotomy  $\equiv$  FV conjecture

[FederVardiSIAMJComp98, BourhisL\_\_KR16, FeierKuusistoL\_\_ICDT17]

# (Frontier-)Guarded Disjunctive Datalog

FGDDL<sub>g</sub>: for every head atom, there is body atom that contains all its variables

GDDL<sub>g</sub>: there is body atom that contains all variables of the rule

For both languages, all of the afore mentioned problems are open

Query containment should be a good starting point—conceptually simple

Three approaches:

- Demonstrate witnesses of simple structure (for non-containment)
- Demonstrate small witnesses
- Reduce to CSP or to MDDL<sub>g</sub>